

REMARKS

Claim 1 is amended to recite that the alkyl amine is of the formula R^1R^2NH wherein R^1 or R^2 comprises at least one linear or branched, saturated or unsaturated C_8 - C_{40} alkyl group. This amendment is supported in the specification particularly in that di-n-octylamine is disclosed as a species of alkyl amine which comprises a C_8 alkyl group and C_2 - C_{40} alkyl amines are also disclosed, for example at ¶ 0022. Because the specification discloses a species with a C_8 alkyl and also discloses an alkyl range of C_2 to C_{40} with C_8 being a point within that range, the specification discloses to one skilled in the art a range of alkyl groups in the alkyl amines of the invention of C_8 to C_{40} , and thus the amine comprising at least one of such alkyl groups.

Claim 1 is further amended to delete reference to tellurium and selenium from the list of metals. This amendment is without prejudice to the applicant's right to assert the deleted subject matter in this or a continuation application. Claim 1 is also amended to add molybdenum to the list of metals and this amendment to claim 1 is supported in the specification and does not add new matter.

Claim 4 is amended to specify that R^1 or R^2 comprises at least one linear or branched, saturated or unsaturated C_8 - C_{13} alkyl group. This amendment is supported in the specification particularly in that di-n-octylamine and di-tridecylamine are disclosed as species of alkyl amine and C_2 - C_{40} alkyl amines

are also disclosed, for example at ¶ 0022. Because the specification discloses species with a C₈ alkyl and a C₁₃ alkyl, and also discloses an alkyl range of C₂ to C₄₀ with C₈ and C₁₃ being points within that range, the specification discloses to one skilled in the art a range of alkyl groups in the alkyl amines of the invention of C₈ to C₁₃.

Claims 5 and 6 are amended to recite that the alkyl amine comprises di-n-octylamine and di-tridecylamine, respectively. These species of alkyl amine are disclosed throughout the specification as species useful for the invention. As such, these amendments to claims 5 and 6 are supported in the specification.

Claims 7 and 8 are amended as dependent from claims 5 and 6, respectively, rather than claim 4. These amendments to claims 5 and 6 were necessitated by the amendment to claim 4 and do not add new matter.

Claim 11 is amended to recite that, in the lubricating composition of the present invention, the alkyl amine is of the formula R¹R²NH wherein R¹ or R² comprises at least one linear or branched, saturated or unsaturated C₈-C₄₀ alkyl. This amendment is supported in the specification particularly in that di-n-octylamine is disclosed as a species of alkyl amine which comprises a C₈ alkyl group and C₂-C₄₀ alkyl amines are also disclosed, for example at ¶ 0022. Because the specification discloses a species with a C₈ alkyl and also discloses an alkyl range of C₂ to C₄₀ with C₈ being a point within that range, the specification discloses to one skilled in the art a range of alkyl groups in the alkyl amines of the invention of C₈ to C₄₀.

Claim 11 is also amended to delete reference to tellurium and selenium from the list of metals. This amendment is without prejudice to the applicant's right to assert the deleted subject matter in this or a continuation application.

Claim 21 is amended to incorporate the limitations of claim 22, which was dependent from claim 21, that the process include the step of preparing the metal acid hydrate with the additional limitation that the reaction forming the metal acid hydrate occur in water and that the reaction of the hydrate with the alkyl amine occur in water. These amendments are supported in the specification, including in claim 22 and also at ¶¶ 0013 to 0014. Claim 22 is accordingly canceled.

New claim 30, which is dependent from claim 11, is added and recites that R^1 or R^2 comprises at least one linear or branched, saturated or unsaturated C_8 - C_{13} alkyl group. This new claim is supported in the specification particularly in that di-n-octylamine and di-tridecylamine are disclosed as species of alkyl amine and C_2 - C_{40} alkyl amines are also disclosed, for example at ¶ 0022. Because the specification discloses species with a C_8 alkyl and a C_{13} alkyl, and also discloses an alkyl range of C_2 to C_{40} with C_8 and C_{13} being points within that range, the specification discloses to one skilled in the art a range of alkyl groups in the alkyl amines of the lubricating compositions of the present invention of C_8 to C_{13} .

New claim 31, which is dependent from claim 11, is added and recites that R^1 or R^2 comprise at least one C_8 alkyl group. This new claim is supported in the specification in that the specification at ¶ 0022 and elsewhere discloses alkyl groups within the range of C_2 to C_{40} with C_8 being a point within that range and

also discloses embodiments of the invention wherein the alkyl amine is di-n-octylamine.

New claim 32, which is dependent from claim 11, is added and recites that R^1 or R^2 comprise at least one C_{13} alkyl group. This new claim is supported in the specification in that the specification at ¶ 0022 and elsewhere discloses alkyl groups within the range of C_2 to C_{40} with C_{13} being a point within that range and also discloses embodiments of the invention wherein the alkyl amine is di-tridecylamine.

New claim 33, which is dependent from claim 11, is added and recites that the R^1R^2NH comprises di-tridecylammonium. New claims 34 and 35, which are dependent from claim 33, are added and recite that the organoammonium salt in the composition may be di-tridecylammonium tungstate or di-tridecylammonium molybdate. These new claims are supported in the specification, for example at ¶ 0009, ¶ 0022 and in the examples at ¶¶ 0026-0030.

New claim 36, which is dependent from claim 11, is added and recites that the R^1R^2NH comprises di-n-octylamine. New claims 37 and 38, which are dependent from claim 36, are added and recite that the organoammonium salt in the composition may be di-n-octylammonium tungstate or di-n-octylammonium molybdate. These new claims are supported in the specification, for example at ¶ 0009 and ¶ 0022.

New claim 39, which is dependent from claim 1, is added and recites that the reaction product is formed in water. This new claim is supported in the specification, including at ¶¶ 0013 to 0014, and elsewhere.

Claims 14-20 and 24-29 are canceled without prejudice to the applicant's right to reassert the subject matter of these claims during further prosecution of this application or in a continuation application. These claims are canceled to focus prosecution on the claims to the application concerning the reaction product and the lubricating composition comprising the reaction product and should not be construed as any statement or remark with respect to the rejections of the canceled claims in the office action.

At page 2 of the Office Action the Examiner rejects claims 1-18 and 20-29 under 35 U.S.C. § 112 (first paragraph) as failing to comply with the written description requirement and the enablement requirement. The Examiner alleges that the compounds containing tellurium and selenium are stated in the application as "envisioned" and not actually produced. Without making any comment on the Examiner's arguments in this regard, the applicant notes that claims 1, 11 and 21 have been amended, without prejudice, to delete reference to tellurium and selenium. Hence, the rejection that the claims lack written description and enablement for tellurium and selenium, at this time, is moot.

At pages 3-4 of the Office Action the Examiner rejects claims 14-18, 20 and 29 under 35 U.S.C. § 112 (first paragraph) as failing to comply with the written description requirement and the enablement requirement. The Examiner

alleges that, based on the purported teaching of Errington (*J. Chem. Soc. Chem. Commun.*, 1993, p. 649-651), the applicant has not isolated a ditungstate compound, but rather a higher nuclearity tungstate. Without making any comment on the Examiner's arguments in this regard, the applicant notes that claims 14-18, 20 and 29 have been canceled, without prejudice. Hence, the rejection that the claims lack written description and enablement with respect to a ditungstate compound, at this time, is moot.

At pages 4-6 of the Office Action the Examiner rejects claims 1-2, 4-10, 14-18 and 20-23 under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 3,489,775 to de Roch *et al.* ("de Roch") in view of Freedman (*J. Am. Chem. Soc.*, 1959, 81, p. 3934-3839) ("Freedman"). Reconsideration and withdrawal of this rejection is respectfully requested.

The Examiner asserts that de Roch discloses the reaction of a tungstic acid and a nitrogenous base that may be an alkyl amine, including dihexylamine. The Examiner further argues that while this reference does not specifically disclose di-tridecylamine and di-n-octylamine, de Roch discloses the use of several dialkyl amines and allegedly states that the bases contain 1-50 carbon atoms per molecule. On this basis, the Examiner states that given the specific disclosure in de Roch of C₂ and C₆ alkyl groups and the teaching that a wide range of amine may be suitable, the use of di-tridecylamine and di-n-octylamine would have been obvious. Finally regarding de Roch, the Examiner asserts that this reference discloses that a wide variety of polytungstate and molybdate

products containing 2 to 7 metal atoms can be produced from the reaction of the acid and nitrogenous base and argues that it would have been obvious to one of ordinary skill in the art to react dialkylamine bases with tungstic acid in such a ratio as to produce analogous ditungstates.

The Examiner further states that the differences between de Roch and the claims are that de Roch does not disclose the specific tungstic acid set forth in the claims and does not provide a method for preparing the tungstic acid. The Examiner, however, refers to Freedman for the purported disclosure of $\text{WO}_4\text{H}_2 \cdot \text{H}_2\text{O}$ ($\text{WO}_3 \cdot 2\text{H}_2\text{O}$) as one of the two tungstate species and argues that given the small group it would have been obvious to select $\text{WO}_4\text{H}_2 \cdot \text{H}_2\text{O}$ as the tungstic acid species of de Roch. The Examiner further asserts that Freedman teaches that tungstic acid hydrate is prepared by reacting $\text{NaWO}_4 \cdot 2\text{H}_2\text{O}$ with an acid, HCl, and that it would have been obvious to prepare the tungstic acid hydrate by the method of Freedman in order to prepare large amounts of the acid as allegedly taught by Freedman.

Claim 1 is amended to prescribe that the metal acid hydrate be reacted with the specific alkyl amine having the formula $\text{R}^1\text{R}^2\text{HN}$ with R^1 or R^2 comprised of at least one $\text{C}_8\text{-C}_{40}$ alkyl group. The specific disclosure of de Roch pertains to ethyl and hexyl which are not within the alkyl range of 8 to 40 carbon atoms as set forth in the amended claims. The inventor has discovered that the longer chained alkyl groups can be used to form a reaction product. These longer chained species are not specifically disclosed in de Roch and the examiner relies

on a general disclosure of a number of materials potentially having from 1-50 carbon atoms as teaching the reaction with the longer chained species. A laundry list of materials having 1-50 carbon atoms, however, does not teach or suggest the specific alkyl amines comprising an alkyl group of 8-40 carbon atoms as required by the amended claims. Also, the general list of materials in de Roch having 1-50 carbon atoms, does not motivate one skilled in the art to modify the disclosure of dialkylamines of de Roch to apply the specific alkyl amine having the formula R^1R^2HN with R^1 or R^2 comprised of at least one C_8 - C_{40} alkyl as required in the amended claims to obtain the reaction product. Accordingly, de Roch does not teach or suggest the reaction set forth in the amended claims and, in particular, the organoammonium salt reaction product. Hence, the present invention, as set forth in the amended claims, is not obvious over de Roch and Freedman does not remedy the deficiency of de Roch concerning the lack of disclosure of the $C_8 - C_{40}$ alkyl amine in the reaction. Therefore, the present invention is not obvious over de Roch in view of Freedman.

Furthermore, the amended claims require that the organoammonium salt is the reaction product of a metal acid hydrate of the formula $MO_4H_2 \cdot H_2O$ and the alkyl amine. The Examiner refers to Freedman and states that because this reference allegedly discloses $WO_4H_2 \cdot H_2O$ ($WO_3 \cdot 2H_2O$) as one of two species, this reference makes it obvious to select $WO_4H_2 \cdot H_2O$. Freedman does not expressly disclose the tungstic acid species set forth in the claims and further does not include any disclosure which would motivate one skilled in the art to use

the tungstic acid species set forth in the claims. Thus, Freedman does not motivate the art to modify the disclosure of de Roch to use $\text{MO}_4\text{H}_2\cdot\text{H}_2\text{O}$ in a reaction with an alkyl amine, let alone the specific alkyl amines set forth in the amended claims. Hence, de Roch in view of Freedman does not teach or suggest the present invention and, therefore, the present invention, as set forth in the amended claims, is not obvious over de Roch in view of Freedman.

Moreover, in the present invention, the metal acid hydrate is formed in water and the alkyl amine is reacted with the metal acid hydrate in water. Claim 21, which recites a process for preparing the organoammonium salt, is amended accordingly and new claim 39 is added which recites that the reaction product is formed in water. The reaction in water allows for a quicker reaction between the metal acid hydrate and amine and provides for the near complete exhaustion of the hydrate, particularly compared to reactions involving solid metal acid hydrate. (See, specification at ¶ 0014.) In Freedman a solid hydrate is formed and, thus, the combination of de Roch and Freedman at best teaches of the use of solid hydrate and not the aqueous metal acid hydrate as in the present invention. Accordingly, the present invention, as set forth in the amended claims including the process of claim 21, is not obvious over de Roch in view of Freedman.

At pages 6-7 of the Office Action the Examiner rejects claim 3 under 35 U.S.C. § 103(a) as being obvious over de Roch in view of Freedman and further in view of Krause (J. Am. Chem. Soc., 1925, p. 1689-1694) ("Krause"). Reconsideration and withdrawal of this rejection is respectfully requested.

The Examiner refers to the discussion of de Roch in view of Freedman as mentioned above and comments that de Roch states that the metal acid hydrate and nitrogenous base may be reacted under the conditions of Krause and cites to Krause for a process involving mixing and refluxing. Claim 3 is dependent from claim 1 and, as discussed above, claim 1 is not obvious over de Roch in view of Freedman. Claim 3 cannot, likewise, be obvious over de Roch in view of Freedman and further in view of Krause. This combination of references do not teach or suggest the specific process of claim 3 which involves the steps set forth in claim 1, as amended, additionally with mixing and refluxing. Hence, the present invention, including the embodiment of claim 3, is not obvious over de Roch in view of Freedman and further in view of Krause.

At pages 7-8 of the Office Action the Examiner rejects claims 11-13 and 24-29 under 35 U.S.C. § 103(a) as being obvious over de Roch in view of Freedman and further in view of U.S. Patent No. 4,626,367 to Kuwamoto *et al.* ("Kuwamoto") and U.S. Patent No. 5,562,201 to Papay *et al.* ("Papay"). Reconsideration and withdrawal of this rejection is respectfully requested.

Claims 11-13 are amended and remain pending in the instant application. Claims 24-29 are canceled, without prejudice.

The Examiner refers to the discussion above with respect to de Roch in view of Freedman pertaining to the reaction product of a metal acid hydrate and an alkyl amine, but states that these references do not disclose a lubricating composition comprising the reaction product. The Examiner, however, cites to

Kuwamoto as disclosing molybdates and tungstates as standard corrosion inhibitors for a lubricating composition and acknowledges that Kuwamoto discloses water-soluble molybdates and tungstates in aqueous lubricants. Nevertheless, the Examiner argues that based on Kuwamoto it would have been obvious to use the organic-soluble molybdates and tungstates of de Roch in a non-aqueous lubricant. The Examiner then refers to Papay and asserts that this reference discloses a preferred concentration of corrosion inhibitor in lubricating oils from 0.02 to 1 weight percent which is said by the Examiner to overlap or encompass the ranges recited in claims 11-13. On this basis, the Examiner concludes that the use of molybdates and tungstates of de Roch as corrosion inhibitors in a lubricating composition in the amounts taught by Papay meet the limitations of claims 11-13 and that it would be obvious to use the tungstates and molybdates of de Roch in a lubricating composition as Kuwamoto teaches that they are effective corrosion inhibitors.

Claim 11 is amended to recite reaction products from alkyl amines with C₈ to C₄₀ alkyls. The de Roch patent discloses and teaches shorter chained dialkylamines, for example dihexylamines. Submitted with this amendment is the DECLARATION OF ROBERT J. TYNIK UNDER 37 C.F.R. § 1.132 (the "Tynik Declaration"). As discussed in the Tynik Declaration, dihexylammonium tungstate was prepared from dihexylamine in accordance with the teachings of de Roch and combined with oil. This sample was subjected to a Falex Pin & Vee Block test for anti-wear properties, which is a significant property of an oil-based

lubricating composition such as that of the present invention. The dihexylammonium tungstate completely failed the test after only 13 minutes. (See, Tynik Declaration ¶¶ 5). This can be compared to the samples (A, B and C in the table attached as Exhibit B to the Tynik Declaration) of the organoammonium tungstates and molybdates made from a BASF di-tridecylamine product which as stated in the Tynik Declaration contains predominately C₁₃ alkyl, but also has C₁₀-C₁₂ and C₁₄ species, all within the range of alkyl groups in claim 11, as amended. The organoammonium tungstates and molybdates made from the BASF di-tridecylamine product passed the Falex Pin & Vee Block. (See, Tynik Declaration at ¶¶ 4-6.) This data refutes the Examiner's *prima facie* argument that the lubricating compositions of the present invention are obvious over de Roch in view of Freedman and further in view of Kuwamoto and Papay because the shorter chained dialkylamines of de Roch are not soluble in sufficient quantities in oil to demonstrate anti-wear performance and when incorporated at the low level of solubility do not provide the necessary anti-wear properties of an oil-based lubricating compound thus negating any motivation by one skilled in the art to combine the materials of de Roch in a lubricating composition, particularly an oil-based lubricating composition. Therefore, the present invention is not obvious over de Roch in view of Freedman and further in view of Kuwamoto and Papay.

Also, as discussed in the Tynik Declaration, the lubricating compositions in Kuwamoto are non-oil based water-soluble, metal-working lubricant compositions

specifically designed to be used in water, not in oil. In his declaration, Mr. Tynik explains that aqueous based tungstate and molybdate materials operate to provide corrosion resistance by disassociating in water. Because the water soluble tungstate and molybdate materials of Kuwamoto will not disassociate in oil, if one were to place these materials in the oil-based lubricating compositions of the present invention, or any oil based lubricating composition in the art, like those of Papay, corrosion resistance would not occur because there would be no disassociation. (See, Tynik Declaration ¶¶ 3.) Accordingly, because the water soluble tungstate and molybdate materials of Kuwamoto would not be expected by one skilled in the art to provide the corrosion resistance proffered by the examiner as motivating combining the water-soluble materials of Kuwamoto with non-aqueous lubricants, there is no teaching, suggestion or motivation for one skilled in the art to combine the teachings of de Roch and Freedman with Kuwamoto, or for that matter the teachings of these references, with Papay. Moreover, considering that the shorter chained dialkyl amines of de Roch do not work and the Kuwamoto disclosure concerns water soluble material which would not have corrosion resistance in oil, one skilled in the art would not at the time of the invention, by combining the references cited in the Office Action, have any expectation of success in combining organoammonium salts from longer claimed alkyl amines, i.e., C₈ – C₄₀ as set forth in the amended claims, with oil to obtain an effective oil-based lubricating composition. Hence, the present invention is

not obvious over de Roch in view of Freedman and further in view of Kuwamoto and Papay.

Moreover, in the present invention, the lubricating compositions require a major amount of lubricating oil and are an oil based composition and not an aqueous composition. As discussed above, corrosion resistance is a function of the disassociation of tungstate and molybdate compounds which does not occur in oil-based systems. Accordingly, references such as Kuwamoto which concern water-based lubricating systems do not provide any teaching to the art concerning oil based systems because the salts function differently in each system. Thus, the combination of de Roch and Freedman with Kuwamoto and Papay does not teach or suggest the present invention and, at best, would teach of aqueous-based compositions in accordance with Kuwamoto and not the oil based lubricating compositions of the present invention. Therefore, the present invention is not obvious over de Roch in view of Freedman and further in view of Kuwamoto and Papay.

Further, anti-wear properties are the primary characteristic of an oil-based lubricating composition. As demonstrated through the data in the Tynik Declaration, the lubricating compositions of the present invention having the organoammonium salt prepared with the BASF di-tridecylamine product passed the Falex Pin & Vee Block test whereas compositions prepared from the C₆ dialkylamine of de Roch did not. Hence, the oil-based lubricating compositions comprising the organoammonium salt of the present invention possess the

necessary anti-wear properties for oil-based lubricating compositions whereas the use of organoammonium salts made from de Roch's dihexylamines do not provide the necessary properties and are not sufficiently soluble in oil. (See, Tynki Declaration ¶6). Thus, at the time of the invention it would not have been obvious to incorporate organoammonium salts of the present invention made from alkyl amines, comprising at least one C₈-C₄₀ alkyl considering 1) that the shorter chained dialkylamines of de Roch do not work in the present invention and 2) the incorporation of the alkyl species of the present invention has beneficial anti-wear properties which would not, based on the data, arise by combining the teachings of de Roch and Freedman further in view of Kuwamoto and Papay in that the used of organoammonium salts with the dialkylamines of de Roch will not be sufficiently soluble and do not yield the necessary anti-wear properties, even if one were to accept that the combination of references made by the Examiner teach or suggest oil-based lubricating compositions which the applicant does not concede. Thus, the present invention is not obvious over de Roch in view of Freedman and further in view of Kuwamoto and Papay.

Finally, even if one skilled in the art were to combine de Roch in view of Freedman and further in view of Kuwamoto and Papay, he or she would not arrive at the present invention. Claim 11 requires both lubricating oil and an organoammonium salt made from an alkyl amine comprising C₈-C₄₀ species and in claim 30 a C₈ to C₁₃ species. As discussed above, de Roch specifically addresses at most C₆ species and does not provide any express teaching or

suggestion of use of longer chained dialkylamines to obtain organoammonium compounds. Accordingly, if one skilled in the art were to combine de Roch with Kuwamoto and Papay at best he or she would arrive at lubricating compositions comprising C_6 materials (which as discussed above will not work) and not the longer chained, C_8-C_{40} or C_8-C_{13} species (which as discussed above provide beneficial anti-wear properties). Hence, the present invention is not obvious over de Roch in view of Freedman and further in view of Kuwamoto and Papay.

CONCLUSION

The instant application is believed to be in condition for allowance. A Notice of Allowance of Claims 1-13, 21, 23 and 30-39 is respectfully requested. The Examiner is invited to telephone the undersigned at (908) 722-0700 if it is believed that further discussions, and/or additional amendment would help advance the prosecution of the instant application.

If any extension of time for this response is required, applicant requests that this be considered a petition therefor. Please charge any required petition fee to the Deposit Account No. 14-1263.

Please charge any insufficiency of fees, or credit any excess, to the
Deposit Account No. 14-1263.

Respectfully submitted,



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March 12, 2007

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